Vol. 75 March 1958 No. 3

ARCHIVES OF PEDIATRICS

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JOHN FITCH LANDON, M.D., *Editor*

In this issue . . .

L-Glutavite as a Therapeutic Aid in Mentally Afflicted Children

Hyman Goldstein, M.D.

Management of Nocturnal Enuresis in Childhood

Samuel J. McClendon, M.D.

Clinical Pathological Conference

Retarded Child Training

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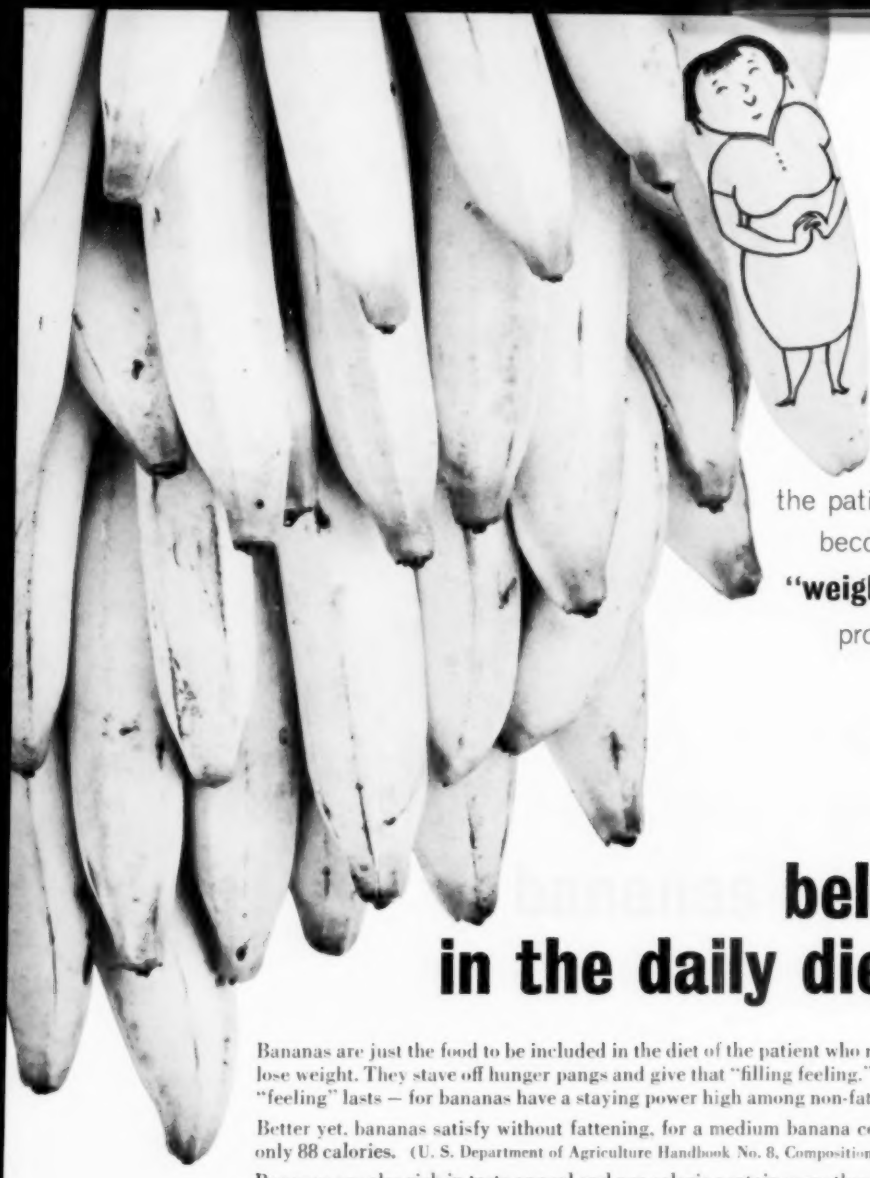

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About ARCHIVES' new Editors . . .

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•

Dr. Michael A. Brescia is at present engaged in the practice of pediatrics, Jackson Heights, N. Y. He received his B. S. degree in 1928 from the College of the City of New York; his M.D. degree (Cum Laude) in 1932 from Loyola University School of Medicine, Chicago. Dr. Brescia successively interned at Brooklyn's Kings County Hospital, serving his pediatric residency at Kingston Avenue Hospital; was Assistant, then Associate Attending Pediatrician at St. John's Long Island City Hospital (1935-57), and Assistant, then Associate Attending Pediatrician at Willard Parker Hospital (1945-56). He is currently Associate Attending Pediatrician at Elmhurst (L. I.) General Hospital. Dr. Brescia's Societies are the American Medical Association, Association of Military Surgeons, American Public Health Association and Queens Pediatric Society. Since 1937 he has been an associate in the School Health Division, Department of Health, New York. For a number of years, Dr. Brescia has been in charge of ARCHIVES' Abstracts and Book Reviews.

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Dr. Herbert V. von Gal is at present Assistant Attending, Department of Radiology, Greenwich (Conn.) Hospital. From 1950-53, he was engaged in the private practice of pediatrics in New York, and Mt. Kisco, N. Y. Dr. von Gal was successively intern and Assistant Resident Pediatrics, Brooklyn Hospital (1944-48); Assistant Resident and Resident Pediatrician, St. Luke's Hospital (1948-50). On entering private practice, he became Assistant Attending St. Luke's, Womans Hospital Division, and Willard Parker Hospitals. He then took a Residency in Radiology at New York Hospital, and in 1956 became instructor in Radiology at Cornell Medical School. Dr. von Gal received his A.B. degree from Duke University in 1941, and his M.D. degree from Long Island College of Medicine in 1944.

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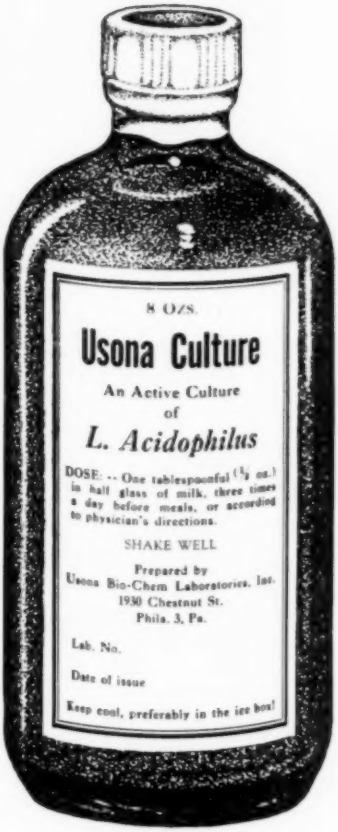
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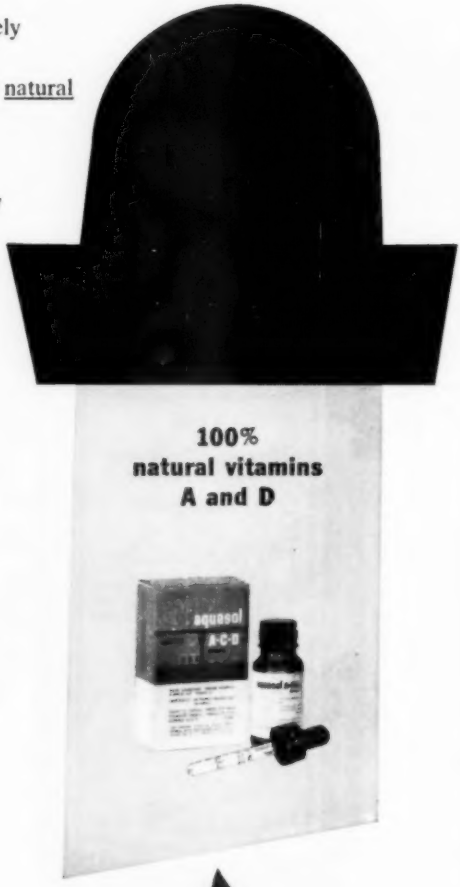

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L-GLUTAVITE AS A THERAPEUTIC AID IN MENTALLY AFFLICTED CHILDREN

PRELIMINARY REPORT OF EIGHTY-ONE CASES AND CONTROLS

HYMAN GOLDSTEIN, SC.D., M.D.

New York.

Mental retardation and behavior problems in children are evidence of cerebral impaired functions and constitute one of our most difficult tasks. Since it is estimated that about two million school age children in the United States, and in equal proportion of childhood population in other nations, are intellectually retarded, it is obviously an important problem, and in reality our nation's primary challenge.

Mental deficiency can be simply defined as arrested mental development due to emotional disturbances, genetic influences, disease, or injury to the brain hindering mental responses. The etiology is a complex one of multifacet sources. Therefore, the therapeutic approach must be multiple to meet the various indications presented by each individual patient.

Among the therapeutic agents which have been tried is L-Glutavite which is believed to primarily act by improving cerebral circulation and oxygen supply, thus benefiting cerebral function. L-Glutavite is a combination of monosodium L-Glutamate, niacin, pyridoxine-hydrochloride, thiamin mononitrate, riboflavin, ascorbic acid, ferrous sulfate, and dicalcium phosphate.

The aim of this paper is to evaluate its clinical effects as an adjunct to other forms of treatment. Eighty-one children were studied of whom twenty-three are congenital acromicria syndrome[1] cases, formerly known as Mongolism, and fifty-eight are non-mongoloid mentally afflicted children of (1) schizophrenic behavior patterns; (2) of prenatal developmental disorders such as oxycephaly, cerebral and cerebellar agenesis, angiomata of cerebral vessels, etc.; (3) paranatal brain disorders due to infections and to trauma; (4) post-natal central nervous system disorders due

to infections and to brain injury; and (5) metabolic brain disorders. Thirty-eight of the non-mongoloid children with mental retardation are cerebral palsy birth victims of a non-familial paralysis or paresis of one or more limbs which occurred before the first year of life. The palsy children presented behavior problems, and different degrees of mental retardation. The clinical varieties of the disorder, which is a brain lesion, either congenital or acquired, is one in which the affected muscles have been released from normal control because of damage to the brain, or to other parts of the central nervous system, or possibly both. They were divided into spastic lesions found in 65 per cent of the cases, chorea-athetosis in 20 per cent, tremor types in 2 per cent, rigidity forms in 4 per cent, ataxic children in 8 per cent, and the atonic and mixed type in only 1 per cent. Temporary anoxia or prolonged hypoxia of the brain is usually the underlying cause for the brain dysfunction. In many instances brain afflicted children are born apparently normal, but months or years later, residual symptoms of brain deterioration suddenly appear in the infant or young child.

Each child received a psychometric assay of intelligence and social maturity scale rating. The I.Q. and social maturity ratings, compiled from standard mental and performance tests on the two groups of children under study, varied from I.Q. 25 to I.Q. 70, and a few registered I.Qs over 70. The children also received a complete neurological examination, special examinations such as electroencephalograms, occasional pneumoencephalograms when necessary, and other laboratory and x-ray work-ups where indicated. Many of the children, especially the mongoloid group, were somewhat restless, impatient, at times negative in their responses, had a poor attention span and concentration ability. However, their behavior generally was fair, and they showed much love and affection. On the other hand, most of the children in the non-mongoloid group with intelligence impairment gave neurological evidence of uncontrolled, poorly coordinated hyperactivity, as well as defiant, hostile, and often uncommunicative behavior, with disturbances in muscular motivity so common with the brain injured child. Twelve children exhibited autistic behavior patterns of schizophrenic tendencies. One child would hyperventilate in clonic sort of breathing arrhythmia, working herself into a cataleptic state. The latter group of children would withdraw themselves from people, play, and reality.

PRELIMINARY STUDY

In March 1957, two lots of material* for this study were received in cannisters which were labeled "A" and "C"; one contained L-Glutavite and the other a placebo. The code letters were not explained.

Ten congenital acromicria syndrome children (better known as mongoloid children)[1], and ten non-mongoloid mentally afflicted children were studied. Five children of each group were placed on "A" cannister contents, and five of each group on "C" contents. Each child received one teaspoonful three times daily after meals diluted in tomato or vegetable juice, or sprinkled into the main dish. The number of patients treated increased daily so that within two weeks there were nineteen children on "A", and nineteen children on "C" cannister therapy. One of these was the control group.

The mothers of the children on "A" cannister nutritional supplement therapy reported after three weeks that their children's improvement was very noticeable — their understanding, attention span, concentration, receptiveness to learning, studies and alertness — as reported by their teachers, and that they behaved more maturely and were orderly. Friends and neighbors commented on the change in the children for the better. The mothers of the children who were on treatment doses from Cannister "C" did not report any new or additional progress of any significance. The difference in the therapeutic effects of the two groups of children was so obviously in favor of cannister "A" that it indicated the contents to be the L-Glutavite, and "C" to be the Placebo, and this was later verified when the letters "A" and "C" were decoded. Cannister "C" which contained milk sugar made up the control material. It was then decided to place all the mentally retarded children on L-Glutavite nutrition supplement so as to also give them the full beneficial effects. At this time, we had nineteen children on L-Glutavite supplement (cannister "A"), and nineteen control children on cannister "C".

New cases were added daily to a total of eighty-one children, of whom twenty-three were congenital acromicria syndrome patients (mongolism), and fifty-eight were non-mongoloid mentally retarded children, who made up this final study group.

The treatment period with L-Glutavite as a therapeutic aid for

*Supplied through the courtesy of Dr. Morris Ringer of the Medical Research Department of Gray Pharmaceutical Co., Inc.

the mongoloid and non-mongoloid mentally afflicted children[2] covered about seven months. Since new cases were added from day to day in this clinical study, the children receiving L-Glutavite were on this therapy from six weeks to seven months, with an average treatment period of four months. A few children reacted with a transient erythema, one with urticaria, which disappeared within several minutes. No other side effects were noted.

The evaluations of the L-Glutavite therapy in this clinical study, the subjective and objective findings were based on the correlation of the following: a thorough medical history of each patient and his awareness of his environment; observations of the patient's activities and understanding as outlined by his parents, relatives, and friends; his acceptance or rejection by his community; his teacher's comment; social case worker and psychologist's report; his social-recreational adjustments; his intelligence rating and social maturity and adaptability determinations; his behavior difficulties if any; a study of his attitudes, attention span, memory and concentration power; integrity; muscle power, mass consistency, coordination, stretch and tendon reflexes, and muscle tonicity, motivation and group activity; his ability to associate and play with children or adults, and any tendency towards autistic behavior. Laboratory tests such as urine, blood, endocrine, electroencephalograms, and pneumoencephalograms when indicated are included. Each child receives a neurologic, pediatric, and endocrinologic examination. This data presents an overall picture of the child and his mental, social, and physical status from which an accurate diagnosis can be made and his potentials determined.

EVALUATION OF L-GLUTAVITE THERAPY

In treating the two groups totalling eighty-one mentally retarded children with specific tendencies, and adding L-Glutavite as a supplementary aid, careful observations were made during the treatment period and the results were tabulated. Of the eighty-one cases, twenty-three were mongoloid children averaging 7.6 years of age with a sex distribution of fifteen females and eight males; and fifty-eight non-mongoloid retardation children averaging 7.5 years of age, of whom there were thirty females and twenty-eight males. The nineteen, placebo treated, control children showed 35 per cent less progress in intelligence and behavior status than the nineteen treated with L-Glutavite nutrition supplement. Again,

the entire group of eighty-one mentally afflicted children in this clinical study could in one sense be considered as controls since their intellectual and social behavior status had been thoroughly evaluated before they received L-Glutavite therapy as compared with their status after treatment several months later.

OBSERVATIONS RESULTING FROM L-GLUTAVITE THERAPY AS AN AID IN MENTALLY AFFLICTED RETARDED CHILDREN

IMPROVEMENT SHOWN IN	RESULTS OF THE THERAPY: NON-MONGOLOID MENTALLY AFFLICTED CHILDREN 58 CASES						CONGENITAL-ACROMICRIA SYNDROM CHILDREN (KNOWN AS MONGOLISM) 23 CASES					
	EXCELLENT		GOOD		FAIR		EXCELLENT		GOOD		FAIR	
	CASES	%	CASES	%	CASES	%	CASES	%	CASES	%	CASES	%
INTELLECTUAL STATUS	8	14	40	67	10	19	12	51	7	33	4	16
PERSONAL HABITS: DRESSING, EATING, SLEEP, TOILET, HYGIENE, UNDRESSING	12	19	36	62	10	19	10	44	12	52	1	4
BEHAVIOR STATUS	23	38	30	54	5	8	13	56	9	40	1	4
AWARENESS OF SURROUNDINGS	16	26	34	60	8	14	13	56	10	44	–	–
SOCIAL STATUS	16	26	20	36	22	38	15	64	8	36	–	–
MEMORY AND CONCENTRATION	12	19	30	54	16	27	10	44	11	48	2	8
EMOTIONAL ADJUSTMENT	14	21	36	60	12	19	12	52	11	48	–	–
MUSCLE DEVELOPMENT COORDINATION, POWER, TENSENESS, RELAXATION	6	12	26	43	28	45	8	36	10	44	5	20
SPEECH	14	22	32	57	12	19	12	52	9	40	2	8

The mongoloid group of retarded children showed an over-all gain in intellectual status of 84 per cent in good and excellent responses, and 16 per cent in fair responses, while the gains in the social status and behavior were 92 per cent and 8 per cent in their respective responses. The non-mongoloid group of retarded children showed 81 per cent in good and excellent responses in intelligence, and 19 per cent fair responses; and, their social and behavior status improved 76.8 per cent in good and excellent responses, and 23.2 per cent in fair responses. Both groups of children showed very encouraging remedial results from the added L-Glutavite therapy, the mongoloid group fared a trifle better. These results reflect well in favor of L-Glutavite therapy as an aid in the treatment of both groups of mentally afflicted children with and without unusual behavior problems.

CASE REPORTS

Case 1. S. R., female, 6½ years of age, suffering from athetotic

type of cerebral palsy for the past four years, with petit-mal, destructive behavior, inflicting self-injury, schizophrenic, and with muscular dystrophy. She would soil herself, was unable to feed herself, dress or undress. She received glandular therapy, vitamins and minerals, glutamic acid in large doses up to seven months ago resulting in mild improvement in behavior. She received anticonvulsants which controlled the petit-mal seizures. Tranquilizers and antihistamines had an adverse behavior effect, making her wild and restless, and they were discontinued. Her rapid mental deterioration exhibited signs of Heller's syndrome. Two years ago she received thalamus, frontal, temporal, and parietal brain lobe sicca-cells[2] intramuscularly, resulting in improved intellectual, social, and behavior status. This improvement endured for one year and three months. Then one day last summer after returning from vacation, she lapsed into her former deteriorated condition of intelligence void and destructive behavior. She was given adenosine triphosphate and ethylene disulphonate therapy, and to our surprise, her destructive and schizophrenic pattern of behavior changed to a normal pattern and she now plays with children, toys, and a doll, none of which she ever did before. She was given L-Glutavite which, in a period of six months, produced visible improvement in intelligence so that she understands everything said to her and is able to communicate with others, and also says a few words such as mamma, dada, I love you, bye bye. After the adenosine triphosphate and ethylene disulphonate injections, she recovered from her muscular dystrophy.

Case 2. C. L., female, six years of age, examined two years ago revealed a condition of cerebral agenesis and hemiatrophy, no speech, flaccid paresis of all extremities and muscle atrophy of calf and biceps. She received fat soluble vitamins A, D and Aquasol E, minerals, thyroid extract, calf pituitary, and glutamic acid therapy. The muscular and mental responses were mildly improved. About seven months ago she was put on the placebo "C" for two weeks without any improvement, then she was changed to L-Glutavite therapy and for the first two weeks given three teaspoons daily, after which the dosage was increased to five teaspoons daily. She began to speak and understood what was said to her. She also knew enough to indicate when she wished to relieve herself. Muscle weakness was the same. She wears braces

and special shoes. For the past few weeks she has received several intramuscular injections of adenosine triphosphate and ethylene disulphonate.[3, 4] A definite change in the muscles is noticeable. There is more muscle mass and less fat bulk in the calf and biceps areas. She sits erect and stands supported. There is clinical indication of muscle fiber regeneration and improved muscle function, muscle power and motivity. L-Glutavite is also helping her mental responses.

Case 3. A.H., male, four years of age, diagnosed a congenital acromicria syndrome (mongolism) under care for the past year. He received sicca-cell therapy of thyroid, pituitary, placenta, parietal and temporal brain lobe cells, from February to March 1957, also cytomel, calf pituitary, vitamins and minerals, and glutamic acid. His improvement was 35 per cent greater than before treatment. A year after he received the sicca-cell therapy, it was noticed that the flat occiput began to round out, evidence of bone growth. Intellectually he improved. His appearance changed gradually for the better. After seven months of glutamic acid therapy, he was placed on L-Glutavite supplement for the next six months. There is evidence now of much more rapid intellectual and social development. He is now a little gentleman and is happy. He can count to 100, and speaks distinctly in long sentences.

Case 4. G. E. G., female, 6½ years of age. She suffers completely from severe athetoid type of cerebral palsy with spasticity and marked ataxia, no speech, disabled since birth. Dr. Samuel Rosner[5] performed a left ptyrian craniotomy three years ago, and using electric cautery removed angiomatous vessels, subdural cyst and freed arachnoid adhesions. The pulseless steel-gray-color of the compressed brain soon changed to a healthy pink and began pulsating actively after release of the pressure through surgery. The following day she was able to feed herself, and shortly thereafter, began to sit, stand, and walk, gradually losing much of the ataxia and athetotic movements. She received vitamin B^1 and B^{12}, other vitamins and minerals, calf pituitary, and glutamic acid. Her improvement was moderate. However, she does not speak though she understands all that is said to her. Seven months ago she was placed on L-Glutavite, but developed erythema, and therefore, the treatment was changed to L-Glutamine capsules which she tolerates well. She began to speak, saying a few words. She

shows considerably more improvement now in intellectual responses and gait, and says mama, dada, bye bye, though her speech is somewhat indistinct. She rides a bicycle and walks up and down stairs. She also takes Aquasol E, the equivalent of 100 mgm. alpha-tocopherols daily.

Case 5. I. N., male, 4½ years of age, oxycephalic, and cerebral arrested development with marked mental retardation and destructive behavior. He wears diapers. He cannot speak. For the past six months he has been given three teaspoons of L-Glutavite daily. Upon re-examination January 29th, 1958, he showed improved physical and intellectual status. He was able to repeat the alphabet, count to five, say mama, da, his own and family sibling names. He indicates by signs his desire to go to the bathroom; he feeds himself. His behavior has improved considerably and he is no longer destructive in his ways. L-Glutavite is obviously responsible for this change for the better.

Case 6. L. K., 16 years of age, female, first visited me two years ago with the complaint of mongolism and mental retardation. She read and spelled poorly, and could not add 6 plus 4 at that time. She was placed on fat soluble vitamins, minerals, pituitary (calf), cytomel, and glutamic acid and improved slowly. For the past six months she has been given L-Glutavite three teaspoons daily in place of glutamic acid. Her last report shows that she passed her tests and was admitted to the seventh grade of Junior High School and is taking French, Latin, English, history, geography, and mathematics. She is with normal children and not segregated with retarded cases as heretofore.

OTHER THERAPEUTIC AGENTS

The problem of treating mentally retarded children will be resolved if we are mindful of the etiologic and pathologic factors involved.

The other forms of treatment received by the children in addition to the L-Glutavite as a therapeutic aid were:

(1a) Endocrine correction, according to indication, with (calf) pituitary whole gland, thyroid preparations in the form of cytomel, proloid, thyrar, also steroids where indicated; (1b) Fat soluble vitamins A, D, and Aquasol E, also vitamins B complex and vitamin C, and minerals; (1c) Dietetic care.

(2) Anticonvulsants to control epileptic seizures, and for the emotionally disturbed children, tranquilizers. Benadryl and other antihistamines also were employed with caution.

(3) Brain surgery was performed in the more severe types of mental affliction with focal objective manifestations.

(4) Correction of vision refraction errors and squints, hearing aids for defective hearing, speech therapy, psychological guidance, vocational and educational programs were instituted to train and help rehabilitate the mentally retarded children and to make them self-sufficient.

(5) Glutamine, 250 mgm. capsules, was given twice daily to eight children in order to study its effects since it is reported to pass the blood barrier of the brain of the mentally retarded.[6, 7] However, the results obtained proved no better than the results observed in those treated with L-Glutavite.

(6) Prophylaxis. If the phenylketonuria baby, diagnosed early, is given a Ketonil (casein hydrolysate low phenylalanine 0.1 mgm. per cent) diet before brain lesions develop, brain injury and mental retardation may be prevented by re-establishing normal metabolic function of the body amino acids transforming them to tyrosine and maintaining a blood phenylalanine concentration of less than 5 mgm. per cent. Caloric intake can be supplied by apple sauce and sweets. Early diagnosis of galactosemia in babies similarly can be treated and saved from mental retardation and development of brain lesions by substituting meat formulae, or soy-bean products for milk.

(7) Brain damaged children, whether congenital or acquired, have difficulty in integrating feelings and actions. Because of this, they are often hyperactive, impulsive, prone to emotional outbursts such as head banging, ear slapping, body swaying, flapping their hands like a bird in flight, biting and scratching others as well themselves, inflicting self-injury, and destructive behavior such as furniture breaking, throwing objects about the room, tearing paper and plaster from the walls. Many of them excite themselves into tantrums, epileptic and cataleptic fits, and hyperventilation seizures. Some of the children acted in an autistic pattern of behavior, typically schizophrenic. Twelve children who were typically schizophrenic with destructive behavior and emotional outbursts, (of whom one also suffered muscular dystrophy, and an-

other from muscular atrophy) did not yield to the various methods of therapy used and were injected intramuscularly with adenosine triphosphate (triphosaden) and ethylene disulphonate daily for three days. In some cases more doses were necessary, and the children were helped considerably. Their destructive behavior changed to a normal pattern of behavior, the tantrums, epileptic and cataleptic seizures stopped, and to our surprise the child with muscular dystrophy was able to get up from the floor with ease. The child with muscular paresis and some atrophy moved with less difficulty and the muscle mass seemed to show evidence of muscle fiber regeneration. The adenosine triphosphate,[8] a phosphorylating agent, and ethylene disulphonate, a hydrogen carrier, favorably alters assimilation and utilization of carbohydrate by the brain and other parts of the central nervous system by providing increased availability of the key enzymes. Their application to disturbances of nervous function, especially attributed to the central nervous system, gives clinical indication of their ability to correct disturbed carbohydrate metabolism of the brain and nerve tracts. Himwich et al,[9] found that the normal brain in children consumes 14.2 mgm. carbohydrate from each circulation through it, and 8.59 volume per cent oxygen uptake upon which the brain depends for its fuel, energy, and proper functioning. The mentally retarded child consumes 50 per cent less carbohydrate, and only 3.63 volume per cent oxygen uptake which is 57 per cent less than normal.

(8) Our aim in treating congential acromicria syndrome children (mongolism) is to improve the immaturity by stimulating mature cellular growth. This condition of congenital abnormal pattern of growth and development of the fetus in-utero involves the long bones and the middle third of the facial skeleton and sphenoid bone, as well as defective myelinization of the central nervous system, and immature development of the brain and other tissues. Furthermore, we find immaturity, and arrested development and growth of the brain and other parts of the central nervous system in many of the non-mongoloid brain afflicted children. To meet this indication, sicca-cell therapy was found to be an excellent and efficient agent without any side effects.

Sicca-cell therapy was introduced by Dr. Paul Niehans in Switzerland, and in the United States by the Author.[10] It helps considerably to mature the corresponding immature gland, organ

or tissue. Sixty-five of the eighty-one mentally afflicted children in this study received sicca-cell therapy. The treated cases have shown better mental, social, and behavior responses. Their infantile pattern of behavior changed to a mature, more normal pattern of behavior and mannerisms. The best results are secured when along with a nourishing diet, vitamins and minerals, these children are given indicated glandular correction in smaller doses, and L-Glutavite.

Sicca-cells[11] are aggregates of dry tissue cells prepared from sections of brain lobes, glands, and organs of fetal or young animals, which are frozen in dry ice, thawed out, powdered in vacuum, and packaged in ampoules. When mixed with Ringer's solution and injected intramuscularly it is triggered off from the site of injection as an active biochemical nuclear cytoplasmic product (named cell-activator or "activin" by the Author) with specific affinity and selectivity for the cells of the corresponding part of the brain or organ, stimulating the hypofunctioning organ, gland, or tissue cells to action. Animal experimentation[12] has shown that sicca-cells, when injected, causes cell regeneration of the corresponding organ or tissue. Teir,[13] in Finland, studied the effect of cell injections on the corresponding organs. The mitotic activity of the liver in older rats is practically non-existent. Teir injected such rats aged several months with liver cells from two-week-old rats. After only forty-eight hours he found a distinct increase in the number of mitoses in the organs of the recipients. But when he injected liver cells from twelve-month-old rats, no effect could be observed. In other words, only young liver proved effective. Teir obtained the same results after injection of skin, lacrimal glands, and gastric mucosa cells. It was shown, time and time again, that the action was specific in that an effect was achieved only if cells taken from the corresponding organs of young animals were employed.

SUMMARY AND CONCLUSION

Eighty-one mentally retarded children of whom twenty-three were mongoloid and fifty-eight non-mongoloid cases were treated with L-Glutavite nutrition supplementation. In treating the children, various other therapy agents were given using a multiple approach aimed to improve all of the areas we could reach of the involved pathology indicated in each child. Applying multifacet therapy helped to meet most indications, improving the

physical condition of the patient, the emotional and behavior disturbances; making him more receptive to learning, and helping to elevate his intellectual and social status to higher levels. It is important to consider the whole child and treat the individual. Failure to obtain satisfactory results by most investigators according to reports is probably due to their expectation of favorable results from a single remedy when the etiological factors, pathology, and disturbed brain and organ are multifaceted.

All of the eighty-one mentally afflicted children in this study received L-Glutavite as an adjunct to the indicated multiple remedial agents, which helped the little patients reap the full benefit from the L-Glutavite. The chart indicates how efficiently L-Glutavite therapy helped them improve in physical, social, and intellectual status.

I wish to express my appreciation to Dr. Morris Ringer for the L-Glutavite and Glutamine; to Dr. David Schwarz of the Schwarz Laboratories, Inc. for the adenosine triphosphate (Triphosaden) ampoules, and to Mr. Edward H. Spicer of Spicer and Gerhart Co. for the ampoules of ethylene disulphonate.

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MANAGEMENT OF NOCTURNAL ENURESIS IN CHILDHOOD

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Enuresis in children has been defined as involuntary micturition, after 3 years of age, when normal children can usually control micturition. A. C. Abernethy and E. M. Tomlin[1] in discussing this problem reported that incidences of enuresis in 16 per cent of children would be higher if all enuritics were seen by physicians. There has been some hesitancy, on the part of physicians, in subjecting a child to a complete urological examination. Campbell, Bokwin, Everett[2] have stated that enuritics who do not respond to routine pediatric care in two to three months, and in addition have pyuria, should have a complete urological study, including cystoscopy.

The common pathologies that are encountered are urethral stricture, edema of the bladder neck, low grade trigonitis, and trabeculation of the bladder to overcome the narrow outlet. The plethora of literature is convincing evidence that the problem of enuresis is still a very great one; the correct management on the basis of drug therapy or psychotherapy is the only answer to the problem. Many therapeutic measures have been advanced, and in a multitude of reports have had their advocates. Among drugs that have been effectively used are Belladonna, Amphetamine, Phenobarbital, Banthine and many others.

The purpose of this article is to detail our experience in the treatment with Meprobamate* of enuresis in sixty children. For the purpose of the clinical study certain specifications were determined in the selection of cases. All cases, either male or female, were to be 8 years to 14 years of age. In all instances organic diseases and anomalies of the bladder or urinary tract were to be excluded by careful history, physical examination, catherized urine specimens or complete urological studies, including retrograde pyelograms and cystoscopic examinations. Complete neurological examinations were done on all, including x-rays of the lower spine and sacrum to exclude neurologic disease, spina-bifida and congenital anomalies. All of the sixty cases to be reported had

* The Meprobamate used in this study was supplied by Wyeth Laboratories Inc.

had a therapeutic trial on various drugs commonly employed for the condition. Four of the cases had complete courses of psychiatric treatment under competent psychologists. No mentally retarded children were included in the study. In conjunction with the management, instructions were given concerning voluntary bladder training, fluid restrictions, avoidance of harsh disciplinary measures and bribery. These measures were discussed at a conference with both parents. The child in each case was given specific instructions about these things, and also was given encouragement about the final outcome of enuresis.

In the past year and a half, a total of sixty cases of nocturnal enuresis have been treated. There have been 32 males and 28 females. The age range has been from 8 years to 14 years. The conditions mentioned earlier have been conformed to. The parents, in all cases, have had impressed upon them that prolonged and continued cooperation and optimism are essential for success.

In the beginning the dosage of Meprobamate had not been determined. Also, it was decided to advocate, along with the medication, other general advice concerning the problem and its management. In a conference with both parents present, a definite program of instruction was proposed, including a timed plan of voluntary micturition, fluid restriction after 5 p.m. and avoidance of disciplinary measures and electrical timing devices.

The initial dosage was established at 400 mgs. of Meprobamate at 6 p.m. After one week, if there had been no improvement, the dosage was increased to 400 mgs. at 4 p.m. and 8 p.m. This dosage was maintained for thirty days irrespective of results. If a success was secured, the medication was reduced to 400 mgs. at 6 p.m. After thirty days additional the medication was stopped entirely. Each case has been followed for at least six months after the medication had been stopped. If relapse occurred, one month's treatment was again advised. Complete blood counts and routine urinalyses were made every two weeks. There were no disturbances in either category. Out of the sixty cases followed and checked in the way described, there have been forty-one complete successes, ten partial successes and nine failures. The average age of all patients was ten years. A few illustrative cases will serve to show the type of case used and the results obtained.

Case 1. The patient was a male, 12 years of age, in good general health, physically and mentally. His parents were well. There

were two other children in the family, both girls, aged 6 years and 8 years. The patient had always had nocturnal enuresis. He had completely negative urological and neurological studies and examinations. He had had adequate and prolonged treatment with Belladonna, Phenobarbital, Banthine, Amphetamine and electrical stimulus therapy. He had been examined and treated by an experienced child psychologist. His social adjustment at school, and at home, was considered satisfactory. After a conference with the patient and his parents, and after instructions concerning his general program and training, he was placed on Meprobamate 400 mgs. at 6 p.m. for one week. No appreciable improvement was noted after one week. At the end of that time the dosage was increased to 400 mgs. at 4 p.m. and 8 p.m. At the end of the second week complete control of the enuresis was established. The same dosage was continued for thirty days, and at that time the dosage was again reduced to 400 mgs. at 6 p.m. There was no recurrence of the enuresis. The dosage of 400 mgs. was continued for thirty more days, and then stopped entirely. There was no relapse after six months.

Case 2. This patient was a female, 14 years of age, in good health. There had been a history of nocturnal enuresis in both parents. There were four other children in the family; two brothers age 6 and 8, and two sisters age 10 and 12 respectively. The patient had always had enuresis. She had an entirely normal physical and mental examination. A complete urological examination, which included a thorough cystoscopic examination and pyelogram, was negative. Her school and social adjustment were good. This patient had had thorough trials on all the usual forms of management, including drugs, toilet training and electro stimulus, all without success. She was started on 400 mgs. of Meprobamate at 4 p.m. and 6 p.m. There was considerable improvement after one week, and complete control of the enuresis after two weeks. The same dosage was continued for one month, and then the drug was discontinued. There was no recurrence after six months.

Case 3. This patient was a male, 10 years of age, whose family and past history was negative. He had a history of an idiopathic generalized convulsive disorder, recurrent from age 4 years to 8 years. No convulsions had occurred after that time although he still showed some abnormality of his electro-encephalogram six months prior to my examination. His complete urological and

neurological examinations were negative. He had had various anti-convulsive drugs used in the therapy of his convulsive disorder. There had been no favorable effects on his enuresis by the anti-convulsive drugs or by many other therapeutic drugs and measures frequently tried in the treatment of enuresis. Meprobamate was begun after a full conference with the patient and the parents. The initial dosage was 400 mgs. at 4 p.m. There was no improvement after one week. The dosage was then increased to 400 mgs. at 4 p.m. and 400 mgs. at 7 p.m. There still being no improvement, the dosage was increased to 400 mgs. at 12 noon, 400 mgs. at 4 p.m. and 400 mgs. at 7 p.m. In this case, no side effects of the drug were noted. After one month the increased dosage produced no change in the condition, and the enuresis continued in the same degree.

Case 4. This patient was a male, age 9 years, who had always had nocturnal enuresis. The same basic requirements that existed in all the cases were present here. Complete neurological, physical and urological examinations were negative. The initial dosage of Meprobamate was 400 mgs. at 4 p.m. No improvement being noted after one week, 400 mgs. were given at 4 p.m. and 7 p.m. When no change in the enuresis occurred after two weeks, the dosage was then placed at 400 mgs. at 12 noon, 400 mgs. at 4 p.m. and 400 mgs. at 7 p.m. with complete control after two additional weeks.

These cases cited are typically illustrative of the other cases in this series. The use of Meprobamate is not suggested as complete relief for enuresis. However, the high percentage of children who were benefited from the drug merits a thorough trial in those cases where all other methods have failed.

SUMMARY

A total of sixty children in the age range from 8 years to 14 years have been given thorough trials on Meprobamate as part of the management of nocturnal enuresis. These cases were selected because of the failure of all other measures ordinarily employed in the treatment of this condition. Of the sixty cases followed for six months to one and a half years, complete success has been attained in forty-one cases, partial success in ten and failure in nine cases. There have been no unfavorable side effects from the dosage used. Meprobamate in the dosage described is worthy of a trial in cases of nocturnal enuresis which are free from bladder or kidney disease or anomalies, when all other measures of management have failed.

CONCLUSION

This paper discusses a clinical study of the use of Meprobamate, and results, in 60 patients with intractable nocturnal enuresis.

The conclusion is drawn that Meprobamate is of distinct value in the management of this condition even after other methods have failed.

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Febrile Eclampsia in Children: Its Frequency and Diagnosis. (Ugeskr. Laeger, 116: 1419-1423, Oct. 7, 1954). Of 405 children with febrile eclampsia treated from 1938 through 1953, 82% had the first convulsion in the first three years of life, mostly at about 18 months of age. In 62% of the cases the fever was due to acute disease of the upper respiratory tract. In 12.3% of the cases the children were readmitted because of febrile convulsions. Information on 282 of the 372 children treated through 1952 shows that 193, or 68%, have been well. Eight, or 2.8%, have epilepsy. One or more convulsions occurred after discharge in 55 children, without diagnosis of epilepsy, although the observation time is up to 16 years; in a number there are deviations in development. The remaining 26 patients, none of whom had later convulsions, have had psychic difficulties in development. Seven criteria of value in differential diagnosis between febrile eclampsia and epilepsy are listed. 1. Observation for epilepsy is indicated if convulsions last more than 20 or 30 minutes. 2. Epilepsy is to be suspected if the spasms continue in spite of adequate treatment. 3. Focal spasms point to epilepsy. 4. Epilepsy is primarily to be considered if the patient is over 5 or 6 years of age at the first attack. 5. Observation for epilepsy is indicated on history of possible afebrile convulsions. 6. Known familial disposition to epilepsy points to the disease. 7. Electroencephalographic results afford perhaps the best criterion.
—*J.A.M.A.*

CLINICAL PATHOLOGICAL CONFERENCE

TRAINING CONFERENCE ON THE RETARDED CHILD*

TRAINING INSTITUTE ON MENTAL RETARDATION

NEW YORK MEDICAL COLLEGE

FLOWER AND FIFTH AVENUE HOSPITALS

NEW YORK

DR. JOHN B. SCANLAN, Chief Psychiatrist, Mental Retardation Clinic:

The first case will be presented by Dr. Cyrille Halkin, Associate in the Department of Pediatrics, New York Medical College and Coordinator of the Mental Retardation Clinic since its inception. Dr. Halkin.

DR. CYRILLE HALKIN: We are presenting the case of Edward G., not only as an interesting medical problem, but also as a demonstration of the methods employed by the Mental Retardation Clinic in working up and following through on each case.

This child first attended the Mental Retardation Clinic at the Flower-Fifth Avenue Hospitals, on September of 1953, at the age of seven years and nine months. The history reveals that the patient was the second child of a Para III gravida II mother whose first child has the same condition as this patient and whose third pregnancy terminated in miscarriage. The maternal history for this birth was entirely negative of any illnesses or unusual strains during pregnancy. The child was delivered at Adelphi Hospital at full-term, as a spontaneous delivery, after an eight hour labor. The infant weighed seven pounds thirteen ounces. No congenital malformations were noted, and the infant was discharged from the hospital with the mother. The developmental history of this child was somewhat retarded. He sat alone at eight months, crept at one year, stood alone at 17 months, walked without support at two years and two months, imitated sounds at one year and talked in sentences at four years. He was completely bowel trained at four years and urine trained at five and was still

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enuretic at seven years and nine months. At the age of four years and eight months, a diagnosis of Marfan's syndrome was made. Marfan's syndrome is a hereditary, congenital, familial condition in which the lenses of the eyes may dislocate anteriorly or posteriorly on any sudden movement. The diagnosis of Marfan's syndrome necessitated surgical removal of the lens of the left eye. This operation was performed at the Brooklyn Eye and Ear Hospital. The only other illness Eddie had was whooping cough at three and a half with no known complications.

The parents suspected retardation when the child did not walk until he was two, and noticing his language development to be so poor, they visited the Bureau of Child Guidance of the Board of Education in March of 1953 when Eddie was seven and a half. They were told to return in one year because of some hesitation in allowing this child to attend school because of his eye problem, in addition to his severe mental retardation.

We will hear the psychiatric social worker, Mrs. Feiden, give us the social intake history on this family.

MRS. E. FEIDEN: This is the history that was taken at intake. The informant was Mrs. Helen G, the mother, intelligent and reliable.

Family history: Father, Henry, 38 years old, employed as a shipping clerk. He has now started to work for his BA degree, taking courses at night and hopes to eventually become a traffic manager, thereby increasing his income.

The mother, Helen, is 36 years old. She is a very articulate person who has become somewhat philosophical about her problems with the children. She seems to be aware of Edward's limitations and potential and said she knows that basically nothing about his condition can be changed and is therefore grateful for any progress which he does make.

Sibling: Henry, born January 30, 1944, has Marfan's syndrome. He too is retarded but less so than Eddie. Also, he is more adept physically and therefore better able to play with other children. There is considerable sibling rivalry on the part of Edward toward this brother.

One gets the definite impression that Mr. and Mrs. G's marriage is based on a very solid relationship. They are able to talk freely with each other.

Developmental and social history: Edward was born October 20, 1945. His development was slow. As a baby he was very placid and easy to care for. When he was one year old Mrs. G had to be suddenly hospitalized for an appendectomy and the mother dates this as a beginning of a personality change in Edward. He became very demanding and was unable to express himself or make his desires known.

At the age of three the parents noticed that he, too, was showing symptoms of Marfan's syndrome. At four and a half he had an operation for this. Mrs. G said they were unable to prepare Edward for this because the operation had to be done immediately after the lens fell into the anterior chamber and they could not predict this in advance. Both eyes were bandaged for seven days and he had to be strapped into his crib because he would tear at the bandages and in general was very uncooperative.

One of the parents was at the hospital constantly. The mother said she knows that this hospitalization was handled very badly and that he should have had more preparation for it, but the medical problems had to take precedence over the psychological implications.

After this he was extremely difficult to handle, very fearful, cried easily, showed evidence of compulsive behavior and was constantly fighting with his brother.

The parents were attending the Association for the Health of Retarded Children and asked to be put on the waiting list for this Clinic once they felt his medical problems were at least temporarily under control.

Impressions at the time of intake: This seems to be a family with many strengths which can be utilized. Partly because of the many medical complications, they have tended to be overprotective of Eddie and they need help with management. Also, there is a problem around our patient's relationship with his brother. The degree of Eddie's compulsivity will have to be explored further. It will be important to determine what part, if any, emotional disturbance plays in the degree of his retardation.

Dr. Halkin: At the time of admission to the Clinic in September of 1953, the mother stated that the left lens dislocated very easily and, therefore, Eddie's physical and social activities were greatly limited by his own and his parents' anxiety. The mother also stated that he was an extremely fearful and anxious

child who required more attention than usual and had difficulty in expressing himself through speech. He enjoyed playing with blocks, brush painting, cutting paper and tricycle riding. He also enjoyed playing with other children and his brother. Although Eddie is clumsy, because of his defective vision, he plays well in sedentary games. The family history was entirely negative for three generations back for either Marfan's disease or mental retardation.

Physical examination revealed a blond, fair, pale and fearful child who wore thick corrective lenses. The physical examination was essentially negative except for stooping posture and unusually long tapering fingers and hyperactive deep tendon reflexes.

A provisional diagnosis was made of multiple congenital anomalies consisting of cerebral maldevelopment, congenital dislocation of the lenses of both eyes and skeletal malformations. Laboratory workup of blood count, urine, cholesterol and esters was entirely within normal limits. X-ray examination of the chest revealed accentuated broncho-vascular markings with no other abnormality and he had had an upper respiratory infection at that time. X-ray of the skull was normal. X-ray of the wrists and long bones revealed no pathology with normal epiphyseal development. X-ray of the lumbar and sacral spine revealed a scoliosis of the lumbar spine with the convexity to the right. Orthopedic consultation revealed the right shoulder to be carried higher than the left with prominence of the ribs and sternum. A mild kyphosis with prominence of the left scapula was noted as well as a dextro scoliosis of the spine. Bilateral pes planus, with pronation of the forefeet and of both Achilles tendons in the heels were noted.

Scaphoid pads and shoe wedging were prescribed as well as exercises in gait and balance by the Visiting Nurse Association. By June of 1954, the orthopedist found that the child had made excellent strides, and required only follow-up exercises for his gait, already greatly assisted by his previous shoe correction.

Examination in the Eye Clinic revealed normal external eye muscles, subluxation of the right lens into the vitreous humor, normal tension to palpation; examination of the left eye revealed the surgical removal of the lens. The discs appear to be normal and no further treatment by the Eye Clinic was indicated at that time.

Dental examination revealed multiple caries and provision for their repair was made.

A psychometric examination was administered because of the extremely fearful and anxious state of this child. The psychological report was also to be considered for this child's possible school placement. The psychological report will now be given by Dr. H. Michal Smith, who is Chief Clinical Psychologist of Flower-Fifth Avenue Hospitals.

DR. MICHAL SMITH: In examination Edward was extremely hesitant about being left in the examiner's office without his mother. He was calm when she agreed to sit outside the door, but several times ran out to her in tears.

A part of this behavior seems to reflect his generalized insecurity and a part simulated to the test challenge. At some points he would rationalize inability on the basis of his visual difficulties, although there were times when this did not seem to present a genuine handicap to him. He was easily frustrated and defeated by unfamiliar tests even when the latter were within the limits of his ability.

With persistent encouragement, some extra measure of success could be elicited.

On the Stanford-Binet Intelligence Scale, Form L, at the age of seven years, ten months, he attained a mental age of three years, five months and an IQ of 44 with a wide gamut of function ranging from the low defective to the defective levels. He attained a basal at the two year level, that is the low defective level and a ceiling at the six year level, the defective level, with predominant failures in the visual-motor area as in form perception, manual control and manipulation, directly ascribable to his visual and cerebral impairment and other failures as in immediate memory, attention and concentration, due to his prevalent anxiety reaction, his lack of confidence and his fear of new situations.

His highest achievement at the four and five year levels above his mental age occurred in the areas of verbal expression and in tests tapping awareness of social stimuli. However, this achievement in the upper range was irregular and disturbed by his unstable cooperation.

It is believed that special help and training in the face of his visual problems and treatment in regard to his emotional disturbance might well enhance his functioning to some degree.

The total diagnostic impression at that time was: mental retardation with multiple congenital anomalies. Intellectual function: low defective in the visual-motor area; defective in the verbal-conceptual area, potential somewhat higher. Personality adaptation marked by behavior disorder symptomatized by anxiety, negativism and uncooperative attitudes.

DR. HALKIN: The psychological report was forwarded to the Bureau of Child Guidance which exempted Eddie from school for three years, because of his anxiety and his inability to cooperate during the testing situation. It was also felt that the eye problems would present too many difficulties in a school setting. Referral was then made to our educational department, in order to have the child attend individual tutoring sessions, both to orient him towards school placement, and also to determine if possible, his level of functioning. This tutoring was to continue for a period of six months and then an attempt at repeat psychometric testing and re-evaluation would be made.

Mrs. Einstein, the educational therapist, will now report on her sessions with this child.

MRS. I. EINSTEIN: Edward first appeared shy, bewildered and frightened, but the presence of his mother during our sessions gave him reassurance. He appeared well kept, took great pride in his appearance.

Educationally, however, he performed on a low level. His speech was indistinct. He was only able to count up to two. He could draw circles only. To write his name, he attached an odd number of horizontal lines to a vertical one, supposedly to represent an "E". Colors could neither be named nor recognized. However, he understood simple directions and was able to name simple pictures such as, boy, girl, plane, train, etc.

His visual perception and his visual-motor abilities were greatly impaired. His movements were jerky and awkward. His scribbling was almost spastic. In spite of severe handicaps, this child showed a determination and a willingness to cooperate. For him, these sessions meant going to school just as the older brother did and his motivation was so strong it was able to overcome his fears and to establish a good relationship with me, leaving his mother in the waiting room after a very short period of time.

At this initial training, emphasis was put on stimulating his perceptive and auditory shortcomings and to give him enough inter-

esting and challenging material. He experienced success and in order to get more self-confidence, encouragement and praise had to be given generously when needed and deserved.

We used large wooden beads to be strung and sorted for color and shape. Blocks of various colors to make simple designs. Form balls, variety of puzzles simple enough to be handled and to be inserted into place; picture lottos and picture dominoes.

His manual dexterity was fairly good and he was almost compulsive in his attempts to put things together, such as trains and blocks.

After the six month trial period, he was ready and anxious to accompany his brother to school.

He now counts up to five. He recognizes numbers. He writes his name clearly, "ED", although this performance reveals his confusion in spatial relationships and he sometimes puts the "D" before the "E". He is now able to name, match and recognize colors, objects and forms, such as a triangle, square and star. He shows good auditory-verbal comprehension and although his performance is far below his chronological age, his educational improvement, given adequate stimulation and training cannot be overlooked.

Ed appears ready soon for a reading readiness approach which takes into consideration his visual difficulties and which should incorporate special methods in kinesthetic and auditory training.

Future educational planning should also include the search for and development of areas where Ed could do as well as his brother, which he has to fight now since he cannot catch up with him educationally.

DR. HALKIN: Repeat evaluation on psychometric and psychological workup was performed, both in routine testing and on the Rorschach.

DR. MICHAL SMITH: Again he showed some apprehension when entering the examining room. However, he quickly regained his composure and gave the examiner a fair amount of cooperation. He spoke in a soft, shy manner; occasionally even interrupted the test procedure to chat about trivialities that came to mind but voluntarily resumed the task at hand.

Since last testing the boy has been getting special educational tutoring with a reportedly good relationship having been established with the therapist.

At this time he seems somewhat less insecure and disturbed than he was in his clinical behavior last testing.

Intellectual evaluation: At the age of ten years and six months, Edward attained a mental age of four years and three months and an IQ of 40 on the Stanford-Binet, indicating a slow gain of ten months in mental growth since his last examination two and a half years ago.

The scatter of scores is still as wide as previously, with the visual-motor area most downgraded. His function continues to range between a low defective and defective levels. His basal age level has moved upward from the two to the two and a half year level; while his ceiling, the plane on which he failed all tests given, has increased from the six to seven year levels.

In contrast to his verbal concept development which meets six year expectations, and is on a defective plane, is his markedly poor visual-motor adaptation, which is qualitatively at no more than the three year old level and reflects not only visual, but also cerebral impairment. In this area, he demonstrates poor eye-hand control, tendencies towards confusion and spatial disorientation.

His rote memory continues to be poor. He was unable to repeat more than two digits. Other tests of memory, as repeating simple sentences, copying a bead chain, naming objects and pictures from memory, were all failed above the two year level. His number concept is also inferior. He could not count four objects in three out of three trials.

His mental growth continues to move slowly ahead, but with marked disparity between his visual-motor and verbal functioning in favor of the latter.

In view of his continued emotional problems, symptomatized in his fearfulness, it is possible that his potential may be somewhat higher than his present scores indicate.

Personality through the Rorschach evaluation: The Rorschach Ink Blot Test was administered to help determine the scope and depth of his emotional problems. A very strong tendency towards preservation or compulsive repetition was found, suggesting not only the poverty of ideas and limited capacity for experience, but also a need to repeat responses in a like situation in order to insure security. What he offers is very meager and evasive and anxiety seems to prevent him from producing except on a very low level. He shows an inability to handle situations which happen to be relatively unstructured and unclear and a tendency to retreat from

facing situations that might carry some emotional impact. His tendency to perseverate on the percept "house" indicates his overwhelming need and wish for protection and shelter.

The extent of his anxiety and feelings of inadequacy do not dispose him to perform under stress. New situations are a threat to him out of his fear that failure would have to be faced. He would thus refrain even from performing in situations in which the objective chances are that he would succeed. Without a therapy situation where the child might be able to experience success in interpersonal relations and small undertakings, the child is unlikely to get over his anxieties and insecurities.

DR. HALKIN: In March of 1956, Eddie's brother was attending the CRMD classes at the neighborhood school, and since Eddie had made some progress in diminishing his anxieties and fears, as well as showing a great desire to attend school, the educational consultant was requested to investigate and attend to possible school placement. The child was finally placed in a CRMD class at the same neighborhood school in November of 1956.

Mr. E. Snyder, Assistant Supervisor of CRMD of Board of Education will discuss Eddie's school placement, adjustment and progress there.

MR. E. SNYDER: We contacted the Bureau of Child Guidance for the acceptance of this youngster into a school situation even though the IQ score didn't fall within the limits suggested by the State Law.

A review of the case was made and a new psychological was administered. The psychologist at the Bureau of Child Guidance found the youngster with an IQ of approximately 50, which is reason enough for placement. In addition to that, prior to the placement, a conference was held between the teacher and the supervisor of CRMD classes in that particular district, where the problem was outlined for the teacher carefully. She suggested that she would like to work with this youngster and it became almost a challenge to her.

The present report from the teacher through the supervisor who regularly visits the class is, that when Eddie was first admitted to the class he stared at the floor, didn't look around or talk to anyone and when he was talked to by classmates, he, to quote the teacher, went into a trance.

Now, a year and a half later, Eddie has established relationships with children in his classroom, he goes on simple errands, he empties the wastepaper basket, he delivers bank money and delivers milk to the school. The teacher reports that he no longer stares and has made an excellent social adjustment.

She also reports, however, that he does no academic work at all and he cannot score on a reading readiness test with any percentage whatsoever. That minimally he can handle manipulative material and a few puzzles and he has great difficulty in matching discs.

Now, this is not a contradiction of the work that was done by the therapist here. I think we must recognize the fact that individual gains made by a child in a clinical situation are not necessarily manifested in a group situation and what represents improvement on a clinical basis through a specific technique, sometimes cannot be demonstrated with the utilization of other techniques. And, the factor here is, of course, the group involvement of Eddie. This suggests that there should be and will be a cross-referral between the teacher and the educational therapist here at the hospital.

With respect to the diagnosis and prognosis for this youngster, from the viewpoint of education, Eddie, I do not think, will ever achieve any academic success at all; with great pains, he may, at some later date, reach an academic achievement level of approximately the first grade on standardized testing. Beyond this, we do not expect him to go and the chances are that he will not be able to handle tool subjects at all.

With respect to vocational prognosis, although we like to be guarded with a youngster who is fairly young, this is a twelve and a half year old youngster, with his double disability, physical handicap as well as mental handicap, the chance for his taking his place in a competitive society is rather limited. This youngster belongs in a slow track of retarded children, who will probably reach terminal schooling at age seventeen and then be advised to seek help in a sheltered workshop through the Division of Vocational Rehabilitation.

Dr. Halkin: The need for Speech Therapy was indicated both by the psychologist and the medical department and a speech evaluation was performed in November of 1956.

The results will be presented by Dr. Leberfeld, the supervisor of our Speech Clinic.

DR. D. LEBERFELD: This patient was first seen for language and speech evaluation on November 29, 1956, at which time he was eleven years old.

The child conveyed his needs verbally at the initial interview and also apparently in the home as reported by the mother. Edward exhibited marked difficulty in focussing when first seen. This was undoubtedly related somewhat to his eye condition, but also to the process of attention.

The examination revealed the patient to have good recognition of pictures. He was also able to name and match pictures presented to him. Comprehension in speech was fairly good. Muscle function of his articulators for speech was adequate, though somewhat sluggish. His spontaneous speech was rapid, slurred and sparse with some infantile speech patterns.

Edward displayed limited auditory memory span and also noted were fragmentary sentence structure and at times irrelevant verbalization.

His voice is extremely nasal, which is probably the result of the fact that he has very poor breath control.

His communication to others was ineffective and limited. His visual-motor functions were poor. The patient was able to copy a circle and cross, but unable to draw a triangle or square. It was also noted at this time that he used his right hand consistently.

The child had inconsistently established color concepts, good form perception, no number concept.

Edward was then seen for speech therapy on a twice weekly basis and to date has had approximately fifty-two sessions. The therapy was directed towards helping this child learn to focus on material presented visually, through visual-motor and visual-perceptual activities, such as puzzles, tracings, drawings, writing, etc.

To help increase auditory memory span, the hearing tube was used for repetition of nonsense syllables and digits. The hearing tube, as we use it, is really a length of rubber tubing at one end of which is an ear olive and at the other end of which is a metal funnel.

In addition, recall was elicited by the recounting of details of a story read aloud by the therapist. To develop more complete coherent verbalization, action pictures, stories and classification word games were used.

Through the combined avenues of auditory, visual and kinesthetic stimuli, a reduction of Edward's marked articulatory difficulties was attempted. Number concepts were encouraged through the use of concrete counting examples.

Since the child's compulsive behavior patterns interfered with the activities in therapy, sessions were so structured as to help Edward overcome his restrictive participation.

The results of therapy seemed to show the following:

Edward has shown some slight improvement in manipulating puzzles and marked improvement in tracing and copying. He still has some difficulty in ambulation.

He displays limited improvement in auditory memory span and also in recall. Articulation has improved significantly, but inconsistently.

Number concepts up to four are stable in development. An increase in affect has been noted together with evidences of the development of a sense of humor and I think this is in part what Mr. Snyder has referred to in terms of participation socially in the classroom.

There has been marked improvement in Edward's attention span and some reduction in his compulsive patterns. Although Edward still persists at times in inappropriate flights of thought, he now expresses himself in more complete logical sentences. Irrelevant statements seem to be brought about whenever any new material or situation is presented to him or whenever completion of an activity is difficult for him.

He presently accepts new tasks and challenges with much less display of tension and has now substituted the phrase, "I'll try," for "I can't do it, too hard."

Now, there is an interesting corollary here that here was a youngster at the inception of therapy with a mental age of less than five years and the literature has persistently and insistently told us that you cannot do much in terms of therapy with the youngster whose mental age is less than five years. We think we have done something. I certainly feel too that the time for doing it had long past and I wish we could have started a little bit earlier.

Dr. Halkin: Mr. Gondor, our art and play therapist, will review his findings for us.

Mr. E. Gondor: These are the ordinary drawings of Edward and they are enlargements so that you should be able to see them in some way.

Edward did not even want to look at the therapist and refused to enter into any conversation. He was withdrawn and displayed anxiety.

The therapist showed him a very simple puzzle, a dog. How could the dog get through this maze into the middle to get the food? Then, he showed it with a pencil line. Afterward, the same puzzle was presented again. He tried hard. (Indicating) Yet, he was not able to understand the problem and he could not solve it.

Some of the forms of the Bender Gestalt Test were presented to him in a playful way but he was not able to copy them.

A circular movement is the simplest movement and every two year old child can be shown and he can do it, because it comes from a rotary action.

His figure drawings are primitive. They are on the level of a three year old. He is not able to differentiate between a male and a female image; they look exactly the same.

In summary, this is a retarded child who responds to the Bender Gestalt Test in the way typical of organic deficiency. Superimposed on that he manifests severe emotional disturbance and anxiety.

Dr. Michal Smith: Edward had a repeat psychological examination in January of 1957 at which time a repeat Stanford-Binet, a Vineland Social Maturity scale and a House-Tree-Person drawing personality test were administered.

He entered the testing room crying. He was extremely anxious and constricted. He was negativistic at first, refusing to deal with any of the test items. As the test proceeded, however, he became less anxious, more friendly and smiled afterwards. He had a fear of manipulating test material objects and he had to be encouraged to dispell his fear of handling the test material.

He was cautious and compulsive in his approach to the test items. He frequently made reference to his brother.

Toward the end of the test, Edward had become much more sociable and adaptable.

At the age of eleven years, three months, Edward achieved a mental age of three years, nine months and an IQ of 39. This rating indicates an increase of two months mental development since he was last tested eight months ago.

Items failed below the mental age were those involving visual-

motor perception and control. Those passed above his mental age involved simple number concepts and vocabulary.

Anxiety continues to be a factor, reducing his test scores to some extent, but his organic involvement, severe visual impairment predominate in the picture.

Personality: According to the Vineland Social Maturity Scale, he has a social age of five years, ten months and a social quotient of 52. He is able, for example, to help at little household tasks, to play cooperatively at the kindergarten level, toilet himself although he has constant nocturnal enuresis, wash hands and face, go to bed unassisted and so on. These learned abilities indicate that he has gotten fairly good training in the home in the areas of self-help and formal social habits.

The HTP projected drawing technique indicates not only some frustration in the face of his organic defects but also attendant body pre-occupation and fears, depression in regard to difficulty in achievement, some rivalry with his brother, expectation of possible trauma and catastrophe in his social situation.

Recommendations for continued speech therapy, continued remedial educational therapy, counselling with parents, and retest in one year were made.

Dr. Halkin: When Eddie was again seen by the pediatrician, his fears and anxieties had so diminished, that he was able to go to school by himself, which involved crossing streets and depending on his own visual acuity and judgment. The parents were advised to look into the community facilities to increase this child's social contact with the outside world, and he is currently enrolled in the retarded troop of the Boy Scouts of America. He was also placed on Trilafon, which is one of the tranquilizing group of drugs, in order to attempt to control his remaining anxieties.

Assistance by counselling with the family to assist them in coping with two retarded and physically handicapped boys was carried on by the Social Service Department.

Mrs. Feiden: On the basis of our initial impression of the family situation and additional information supplied by other team members, our case work treatment goals were the following:

1. To assist the mother in developing concrete managing techniques in the activities of daily living with this child.

2. To encourage the mother to verbalize and ventilate her underlying ambivalence and anxiety regarding his medical condi-

tion with its hereditary overtones as well as his behavior difficulties.

3. To assist the mother in uncovering causes and techniques for the handling of the sibling rivalry.

Before case work was begun, however, we had a psychiatric consultation with Dr. Scanlan.

DR. SCANLAN. The patient and his mother were seen about three months ago for psychiatric interviews in October of 1957.

The mother appeared friendly, cooperative, of normal intelligence and genuinely concerned about her children. Throughout the interview I was impressed particularly by her concern about the methods both she and her husband had used in handling both of their children.

She raised questions about whether she and her husband had been too strict, too inconsistent and had too often forced the patient's brother, two years older, to give into the patient's demands.

Her main complaints about the patient were that he seemed so, to quote her, jealous of his brother. He constantly demanded that he be dressed and treated exactly as the brother is. She complained also that he is stubborn and uncooperative.

It is of some interest that she reacted with surprise but with acceptance. Her phrase was, "It never occurred to me," to my suggestion that the patient might possibly be jealous because his brother was so much more capable than he.

The boy during interview was very quiet and cooperative. He showed very little spontaneity of speech or action. In response to questioning, he showed considerable pride in his going to school, particularly in being in his brother's class.

He seemed quite anxious and fearful but it seemed to me certainly a good deal less so than in previous contacts that were described.

It is my impression that we are dealing here with an emotional disorder of a neurotic type which is to some extent, at least, reactive to parental handling of the child. The importance of early traumatic experience, including the hospitalization at the age of 4, which was described before, cannot be discounted.

Any therapeutic efforts with this child will necessarily involve the mother and perhaps both parents. I therefore have recommended continued counselling on an individual basis, directed at first toward the further exploration of the mother's guilt feelings

about handling of the child—of both children—and further exploration of her underlying feelings toward Edward. I suggested also that drug therapy with Trilafon or some other suitable tranquilizing agent be continued.

We have gone into her overprotection of Edward and the anxious attitude she has displayed. Edward likes to do housework but Mrs. G. was very concerned about this because it seems so effeminate. However, we have been able to have her see that this is unimportant since this is one area of accomplishment for him. She has followed through on this by allowing him to wash floors, vacuum, etc. and has also allowed him more independence, such as walking to school alone.

Our future goals in working with this mother are to help her express further some of her ambivalent feelings about these children, along with the reality factors which underlie her overprotection of them and excessive demands on them.

We also feel it is important to discuss the reality of the father's vocational aspirations and we plan to see him on a regular basis.

Dr. Halkin: At the present time, the child is doing fairly well. He is making strides in self-expression and perceptual function in Speech Therapy, as well as in school.

His behavioral problems are being assisted by parent counselling with the Social Service Department. The child is now attending the recreational activities at the school after school hours, but he is still observing rather than participating. Eddie, as you have heard, is also assisting with housework at home, and seems much happier and better adjusted, both within the school and the family setting.

We will continue speech therapy and parent counselling as long as they seem indicated. We will continue contact with the school and make whatever adjustments that appear to be necessary in the future.

I think this case illustrates the function and the workup and the continued care of the children in our Clinic.

Dr. Scanlan: Although this case is about a rather rare syndrome, in a sense it is a typical case in that it has so many facets. May we now have questions or comments which may be directed toward any of these aspects and toward any of the Clinical Staff who have participated.

Miss Gershoff: In your psychiatric diagnosis you mentioned

emotional disturbance on a neurotic level. Were you excluding the basic mental condition or were you considering that secondary or primary. I think it might be important for us to have that cleared up.

DR. SCANLAN: I should have mentioned that I considered this child to be a true retarded child with a superimposed emotional disturbance of a neurotic type. To what extent his emotional problems prevent his intellectual function from improving is hard to say, but I think it is quite clear that he is a true retarded and functioning on quite a low level. And, he is likely to continue so even with psychotherapy or with counselling for the mother.

DR. GIANNINI: I would like to ask Dr. Halkin what is her prognostic outlook for Eddie now that he has such concentrated team approach in therapy. What can we look forward to with Eddie in the future?

DR. HALKIN: In Speech I think Dr. Leberfeld has made fairly clear that continued work in his perceptual difficulties will attempt to give him more adeptness.

I think that he will be maintained on tranquilizing drugs until his parent counselling can reach a level of stabilization for his fears so that he can function as well as he can with both his mental and physical handicap.

I think that the educational follow-up is very important in that the pressures be not too great on this child who has really quite a limited intellectual capacity and yet I think a great deal of emotional insight. Mr. Snyder is following through very carefully on this boy's school setting and as he mentioned before, probably the Bureau of Vocational Guidance will take over when he reaches the age of seventeen, and I think Social Service will continue to work with the parents to assist them in handling each problem that comes up so that they are well able to cope with what the future holds.

I do not think this boy will be able to take any self-sustaining position in society, but I think with some parental work, custodial guidance, someone to take care of him, he will certainly be able to take his unique place.

QUERY: Since this child is getting a tranquilizer, is there any direction given to the school for observation?

MR. SNYDER: The drug, of course, is not administered at the

school; they observe the behavior which is manifested day by day and if there is marked improvement it would be noted.

If we have this cross-referral, which we do have, we will know whether the use of the drug has been effective.

QUERY: What about the school medical service, the doctor and nurse in the school, do they know that this is going on?

DR. HALKIN: The pediatrician communicates directly with either the school doctor or the school nurse, giving them all our findings and our suggestions for physical activity or limitation of physical activity within the school and they apprise us of what they are physically capable of handling and there is constant communication between school and Clinic.

QUERY: Have the parents ever raised the question of institutionalization?

DR. HALKIN: No, they are very happy with their family and love the boys very dearly with very little overt rejection and the family leads quite a normal family life, taking the boys where they wish to go and taking the boys with them; they are two very nice boys, and well-behaved, possibly too well-behaved according to the psychiatrist, but the family seems very happy with them.

DR. SCANLAN: The older boy is too well-behaved.

QUERY: Do all of your cases that go through Clinic have the same concentration of service as is demonstrated here is my first question.

Secondly, do you have, as part of your research, any estimate of cost per case?

Can we, as society, expect to develop this type of program? In other words, is the end result worthy of the expenditures of money that go into it?

DR. GIANNINI: We feel that we have most of these efforts available in our approach. I would say for all practical purposes, even though it is very expensive as an affair, if we can look forward to a somewhat beneficial result, any result, it is worthwhile to enforce this kind of program for this child.

DR. HALKIN: The services to each individual case are handled again with a team approach, but there would be a variation of service, depending on what is needed in each specific case. An-

other might not need speech evaluation and fifty-two sessions of speech therapy, but may need many, many sessions of art and play therapy. For example, our musical therapy which we have available too.

I do not think that cost can only be placed and added up completely to the one patient; there are a great many people who are affected by this possibly expensive procedure.

In the course of a case all of us are doing research and learning a great deal and of course one of the most important points that we have forgotten and Mr. Snyder brings up, is that we are working toward prevention and assistance to these cases, so this is also basic, basic study as well as treatment.

A QUERY: In addition to what Dr. Halkin has said, which I think is very important in terms of cost, it costs the State of New York now, I would say, upwards of $1,500 to maybe $1,600 a year to simply maintain an individual in a state school, which is what the other alternative is in this case.

There is no real question in anyone's mind that taking away the services of the Clinic or the very real support that a child like this did receive in a clinic, he would have ended up in one of the state schools.

There was a study in 1950 done by the Bureau of Public Assistance of the Federal Government of the persons in state programs for aid to the permanently disabled program, if I got the name of it correctly.

Now, the cost of that program was simply tremendous. Most of the people who studied in that program consisted of individuals with a variety of disabilities who were really being maintained and not really being treated. About 20 percent of the cases or about 20 percent of the families who were covered at that time had individuals in them who were considered to be or were described actually as being mentally retarded or mentally defective or mentally deficient, so that the problem of cost is a tricky one. One has to figure what it is now costing a community to provide custodial care for dependent individuals as well as against the larger questions of cost, not only in terms of dollars and cents but rather what happens in families whose children are not being cared for.

The whole question of cost in rehabilitation services is one that I think is still being studied and certainly the question is really an important one, particularly as groups are not, as I get the im-

plication, as lavishly endowed with services and other disciplines of the type that are possible sometimes in a large center like the New York Medical College and perhaps even in New York City. (Dr. Kalmen)

QUERY FROM THE FLOOR: In view of the statement of cost of custodial care and Mr. Snyder's statement about sheltered workshops as a possible solution for this case and their limited resources in that area, I wondered if this Clinic hopes to point up the need for greater sheltered workshop facilities for such persons.

MR. SNYDER: I think it is not only the responsibility of the Clinic, I think it is the responsibility of all people concerned in the education and care of retarded children. I would like to tell you this, that not a pilot program, but a beginning program in creating just this kind of thing for children beyond the age of seventeen will begin in New York City very soon.

In the beginning it will only care for a few hundred children but we are attempting to carry our program beyond seventeen years of age, at least up through twenty-one, revitalizing and changing our concepts with a view towards making these children partially able to maintain themselves in a community for their lifetime.

DR. SCANLAN: I want to thank everyone who has participated in the presentation of this case and I hope that you found it not only interesting but that it has also concretized some of the material that you have obtained.

TREATMENT OF HERPES ZOSTER WITH CORTISONE. (Illinois M.J., 106:131-133, Aug. 1954). Doenges had his attention attracted to the use of cortisone in herpes zoster in a patient with involvement of the fifth cranial nerve in whom the cornea had become ulcerated. Treatment with cortisone was started because of the eye lesion, and there was a more rapid resolution of the skin lesions, as well as a prompter healing of the corneal ulcers, than could be expected with the conventional methods of treatment. The present report is concerned with 15 patients with herpes zoster, 11 of whom were treated only with cortisone, three with cortisone and chloramphenicol, and one with chloramphenicol alone. All but two of the cases were moderately severe or severe. —*J.A.M.A.*

DEPARTMENT OF ABSTRACTS

Conducted by

MICHAEL A. BRESCIA, M.D., NEW YORK

KULCZYCKI, L. L.; CRAIG, J. M. AND SHWACHMAN, H.: RESECTION OF PULMONARY LESIONS ASSOCIATED WITH CYSTIC FIBROSIS OF THE PANCREAS. (New England Journal of Medicine, 257:203, August 1, 1957).

Six patients with cystic fibrosis of the pancreas, ranging in age from 2 years to 13 years, are described. The two youngest patients are of particular interest because the diagnosis was made in early infancy and therapy aimed at this condition. Lobar atelectasis involving the right middle lobe was detected in each case and persisted in spite of numerous attempts to correct this condition. Surgery was accordingly performed when these infants were 16 months and 22 months of age. Their present condition is satisfactory. The appearance of lobar atelectasis in small babies with cystic fibrosis affects the prognosis unfavorably. We believed that surgical removal was justified under these circumstances. The four other patients had bronchiectatic changes involving either the left or right lower lobe. In two patients, the diagnosis of cystic fibrosis was made 14 months and 18 months after operation. In view of the relative infrequency with which only one segment of the lung is severely affected in this generalized disease, the indication for the removal of the bronchiectatic area is not a common problem. We should like to point out that at present simple diagnostic procedures for cystic fibrosis are available, such as the finger-imprint method or the sweat test, so that any child subjected to lobectomy for bronchiectasis of unknown cause should have the benefit of these diagnostic procedures before operation.

AUTHORS' SUMMARY.

GRANT, W. W.: Observations on Sleep Disturbances in Pre-School Children. (Canadian Medical Association Journal, 77:444, Sept. 1, 1957).

Sleep disturbance in the pre-school child is common but is likely always related to, and secondary to, current physical, emotional, or environmental problems. The major factors involved appear to

change with increasing physical and mental growth of the child. If the sleep disturbance is severe, the child will often show other behavior difficulties for which he may be brought to the doctor, to whom the sleep disturbance is not mentioned. If the physician bears in mind how much such disturbance can produce distress and fatigue in parents, he is more likely to inquire about sleeping problems in young children and attempt to deal with them. The principle of "self demand" cannot be successfully applied in relation to bedtime and other sleep practices in young children. When presented with a sleeping problem in a young child, the physician is well advised to pay attention to such emotional and environmental factors as separation anxiety, rigidity of habit training, increasing awareness of sex differences, and domestic disharmony and fear of family break-up. Although sedative drugs are helpful, they should be used only as a temporary expedient while the total situation is being explored and adjusted as far as possible. Like any other behavior of children which is unacceptable to the parent, sleep disturbance will not disappear if it is "rewarded" in positive fashion by excessive attention, or in negative fashion by punishment. AUTHOR'S SUMMARY

BOUSFIELD, G. and HOLT, L. B.: COMBINED PROPHYLACTICS. VARIATIONS IN RESPONSE, IN CHILDREN, TO DIPHTHERIA TOXOID PRODUCED BY ADDITION OF TETANUS TOXOID AND H. PERTUSSIS VACCINE. (British Medical Journal, 5055:1213, Nov. 23, 1957).

This study is concerned with the field efficiency of mixed antigens where the point of reference was the diphtheria response in children receiving one dose of 30 Lf of purified diphtheria toxoid measured one month after inoculation. It was found that the addition of H. pertussis vaccine to the 30 Lf of diphtheria toxoid enhanced the Schick conversion rate progressively with increase of dose of vaccine—from 50 per cent conversion rate with no vaccine to 95 per cent with 20,000 million H. pertussis microbes. There was no evidence of excess of vaccine although there is evidence that different batches of vaccine may have different toxoid-adjuvant properties. The addition of purified tetanus toxoid to the constant amount of diphtheria toxoid also increased the S.C.R. up to an optimum of about 12 Lf tetanus toxoid/30 Lf of diphtheria toxoid. The addition of 25 Lf of tetanus toxoid resulted, however, in a S.C.R. only equal to that from the diphtheria toxoid alone. The

adjuvant action of the tetanus toxoid was less marked than that of the H. pertussis vaccine. The addition of 5 Lf of tetanus toxoid to a diphtheria toxoid/pertussis mixture resulted in a significantly lower S.C.R. than that obtained without the presence of the tetanus toxoid. It is calculated that the addition of H. pertussis vaccine (20,000 million organisms) increases the antitoxin response to the diphtheria toxoid some fourteen times, and that the further addition of 5 Lf of tetanus to the mixture reduces that increment to about fivefold.

The inoculation of tetanus toxoid separately into one arm and the diphtheria-pertussis mixture into the other produced an S.C.R. identical to that obtained when the diphtheria-pertussis mixture was administered without any tetanus toxoid. The order of mixing the components of the triple prophylactic produced no difference in the conversion rate. AUTHORS' SUMMARY.

GARCES, H. and ARAYA, P.: SEPSIS IN THE NEWBORN. CLINICAL AND PATHOLOGICAL STUDY OF 180 CASES. (Revista Chilena de Pediatria, 28:137, April-May 1957).

The authors report on a study of 180 cases of sepsis of the newborn collected during 16 years (1940-1955). The portal of entry was considered to be prenatally via the placenta in two cases, intranatally, via skin and mucus membrane in ten cases, and postnatally, the portal of entry was found to be as follows: umbilicus sixty-two cases, (34.4 per cent), skin twenty-one cases, respiratory tract twenty cases, digestive tract sixteen cases, conjunctival eight cases, genito-urinary tract two cases and unknown forty cases (22 per cent). The organisms isolated from 117 (65 per cent) of the cases were as follows: Staph. hemolyticus 36 (30.7 per cent), Staph. aureus 25 (21 per cent), Staph. albus 12, Proteus vulgaris 10 and the rest divided among twelve other organisms. The symptoms found in these 180 cases were as follows: septic temperature 48, afebrile and subfebrile temperatures 132, pallor 142, icterus 43, cyanosis 30, skin and mucosal hemorrhages 31, dehydration 91, edema and scleroderma 48, anorexia 142, diarrhea 128, vomiting 23, enlarged liver 98 and enlarged spleen 71, adenopathy 16 and signs of meningoencephalitis 30. The final diagnoses in these 180 cases was as follows: omphalitis 62, bronchopneumonia 57, osteomyelitis 42, arthritis 41, pyodermia 39, peritonitis 28, meningitis 18, pericarditis 8, pleural empyemia 6 and arotitis 5. M.A.B.

PERLSTEIN, M. A.: THE DRUG THERAPY OF EPILEPSY. WITH SPECIAL REFERENCE TO NEWER DRUGS. (Pediatric Clinics of North America, Nov. 1957).

Phenobarbital is the drug of choice for the treatment of grand mal seizures in children, while dilantin is the drug of choice in adults, as are combinations of the two drugs.

Mesantoin and mysoline are the drugs of choice when grand mal and petit mal co-exist. The former exerts a synergistic toxic effect when administered with tridione or paradione.

Bromides, phenurone, mebaral or peganone may be used when none of the above-mentioned drugs is effective.

Tridione is the most effective drug for the treatment of petit mal. Paradione is less effective and less toxic than tridione. Both drugs exert a synergistic toxic effect when given with mesantoin.

Next to tridione, miltown is the most effective drug in petit mal. Because it is so much less toxic than the dione group, it might be wise to consider it the drug of first choice for petit mal.

Prenderol administered with a retarder is effective in controlling petit mal seizures. It has a synergistic beneficial effect with paradione and tridione.

Milontin, celontin and diamox may occasionally be useful in petit mal, when other drugs fail.

Peganone is useful as an adjuvant drug in grand mal and has few side effects.

Phenurone is an all-purpose drug, being most effective in psychomotor spells. Dilantin, mysoline and celontin are also useful in controlling psychomotor spells.

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Control of hygienic and psychiatric factors is important as an adjunct to the drug therapy of epilepsy. AUTHOR'S SUMMARY.

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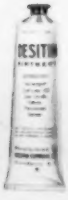

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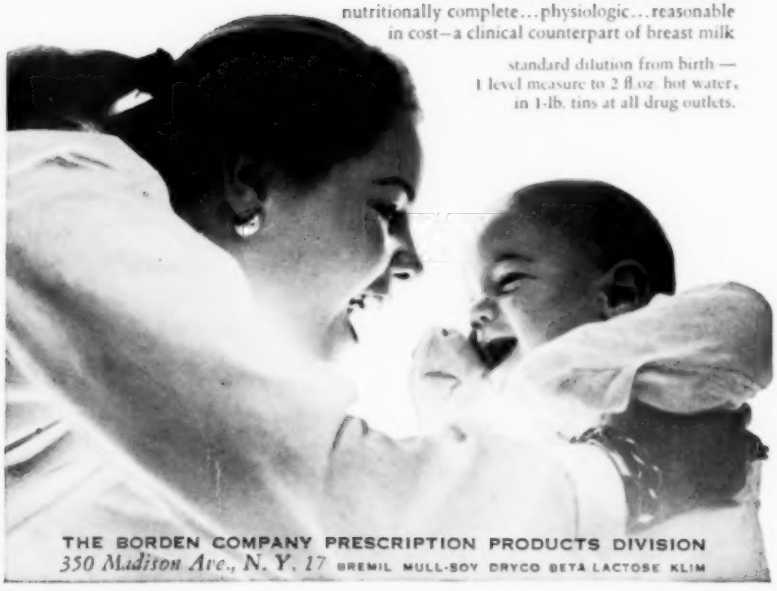

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